RIVERSIDE ELEMENTARY SCHOOL (PWS 6060060)
SOURCE WATER ASSESSMENT FINAL REPORT

January 13, 2003

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the well and aquifer characteristics.

This report, *Source Water Assessment for the Riverside Elementary School, Riverside, Idaho* describes the public water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the PWS.**

The Riverside Elementary School (PWS#: 6060060) is a non-community, non-transient water system. The drinking water system has one well source. The well serves approximately 300 persons and is located on the school's property.

The potential contaminant sources within the delineation capture zones include major transportation corridors (U.S. Route 26, State Route 39), the Peoples Canal and network of irrigation canals. An accidental contaminant spill into these sources could add inorganic chemical (IOC) contaminants, volatile organic chemical (VOC) contaminants, synthetic organic chemical (SOC) contaminant and microbial contaminants to the aquifer. Other potential contaminant sources found were dairies, underground storage tank (UST) sites, mines, landfills, deep injection wells, recharge points, and a wastewater land application (WLAP) site. There were sites regulated under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Superfund Amendments and Reauthorization Act (SARA), and a Group 1 site that shows elevated levels of nitrate that are not within a priority area. Additionally, there were businesses identified that may contribute to the overall vulnerability of the drinking water based upon the type of business or facility. A complete list of potential contaminant sources is provided with this assessment.

For the assessment, a review of laboratory tests was conducted using the State Drinking Water Information System (SDWIS). Total coliform bacteria has been detected thirteen times in tested water during the water system's history, one of which was found at the wellhead in October 1995. Bacteria has been absent from the system since October 2001. The IOCs arsenic, barium, fluoride, lead, and nitrate have been detected in the drinking water, but at levels below the maximum contaminant level (MCL) for each chemical as established by the EPA. Although arsenic identified was below the MCL the system should be aware that in October 2001, the EPA lowered the arsenic MCL from 0.05 mg/L to 0.01 mg/L and the system has until 2006 to meet this requirement. No VOCs or SOCs have been detected in the drinking water.

Final susceptibility scores for the Riverside Elementary School PWS were derived from equally weighted system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in another category results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, IOCs (i.e., nitrates, arsenic), VOCs (i.e., petroleum products), SOCs (i.e., pesticides), and microbial contaminants (i.e. bacteria). As different drinking water sources can be subject to various contamination settings, separate scores are given for each type of contaminant.

In terms of total susceptibility, the Riverside Elementary School's well scored high for IOCs, VOCs, SOCs, and rated automatically high for microbial contaminants. This auto-high rating is due to the bacteria presence at the well source in October 1995. The hydrologic sensitivity score rated high, whereas the system construction score rated moderate. The potential contaminant inventory and land uses scores rated high for IOC, VOC, and SOC, and moderate for microbials.

The capture zones for the well intersects a priority area for the SOC atrazine. The organic priority area is where more than 25% of the wells in the area show levels greater than 1% of the primary standard or other health standards. Atrazine is a widely used herbicide for control of broadleaf and grassy weeds.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the Riverside Elementary School, drinking water protection activities should continue efforts aimed at keeping the distribution system free of microbial contaminants that may affect the drinking water quality. If arsenic in the drinking water becomes a concern, the system may need to consider implementing engineering controls to monitor, maintain or reduce the level of this contaminant in the water system. In addition, drinking water protection activities should focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). The well should meet sanitary standards regarding wellhead protection. Also, any new sources that could be considered potential contaminant sources in the well's zones of contribution should also be investigated and monitored to prevent future contamination. According to the 1999 sanitary survey, the well is located ten feet from a building and is next to a paved playground. Since the building and playground are inside the well's 50-foot sanitary setback, no potential contaminants (i.e., pesticides, paint, fuel, cleaning supplies, etc.) should be stored or applied within this area. Land uses within most of the source water assessment area are outside the direct jurisdiction of the Riverside Elementary School. Therefore, partnerships with state and local agencies, and industrial and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating employees and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods, proper lawn and garden care, and the importance of water conservation to name but a few. There are multiple resources available to help water systems implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Bingham County Soil Conservation District. As major transportation corridors intersect the delineation (such as U.S. Route 26 and State Route 39), the Idaho Department of Transportation should be involved in protection efforts.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning, permitting) or non-regulatory in nature (e.g., good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR
RIVERSIDE ELEMENTARY SCHOOL, RIVERSIDE, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are contained in this report. The list of significant potential contaminant source categories and their rankings used to develop this assessment is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water supply system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the public water system (PWS).**

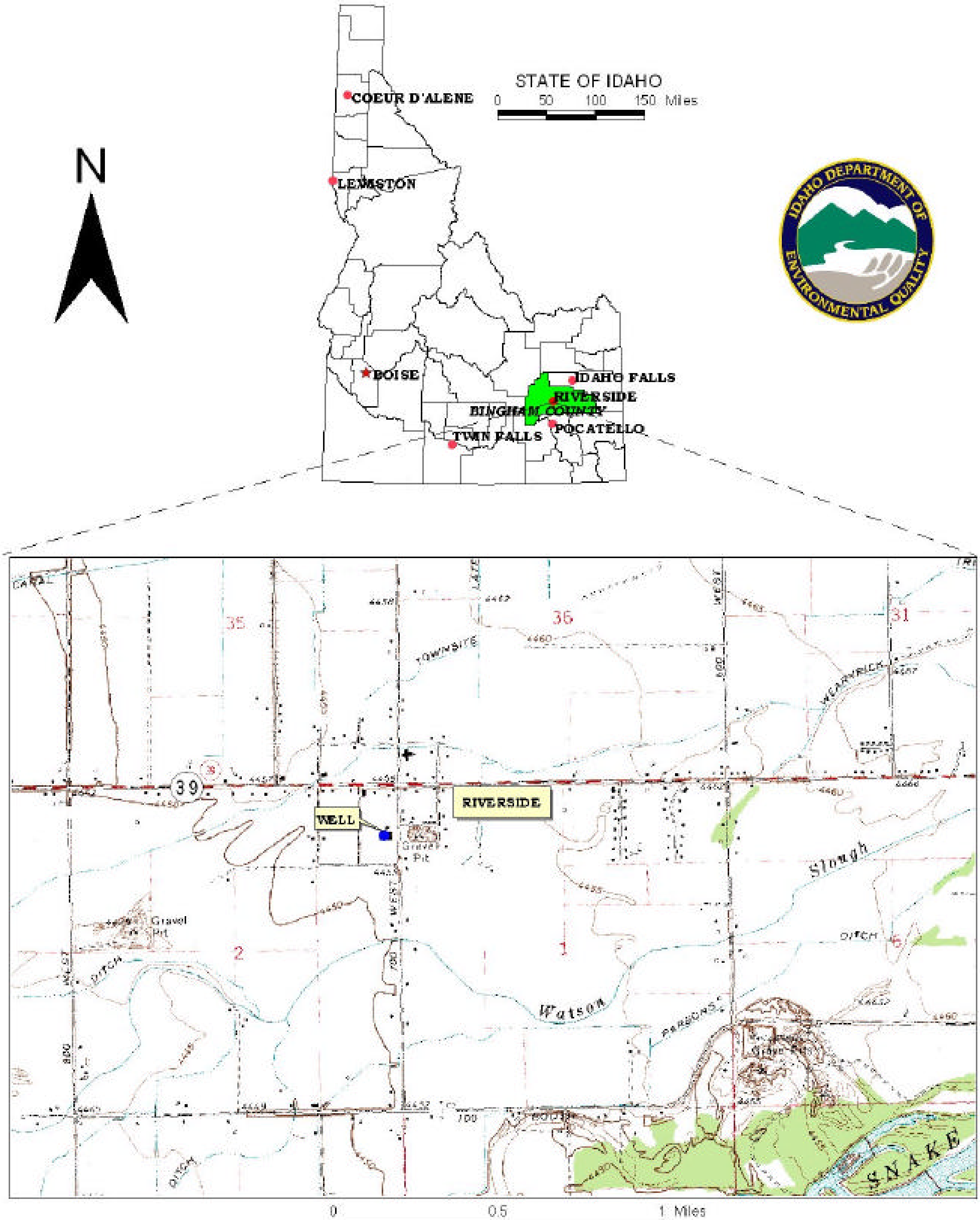
The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community, and be based upon its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Riverside Elementary School is a non-community, non-transient public drinking water system located in Bingham County (see Figure 1). The water system has one well source that provides drinking water to approximately 300 persons. Total coliform bacteria has been detected thirteen times in tested water during the water system's history, one of which was found at the wellhead in October 1995. Bacteria has been absent from the system since October 2001.

FIGURE 1. Geographic Location of Riverside Elementary School



For the assessment, a review of laboratory tests was conducted using the State Drinking Water Information System (SDWIS). The inorganic chemicals (IOCs) arsenic, barium, fluoride, lead, and nitrate have been detected in the drinking water, but at levels below the maximum contaminant level (MCL) for each chemical as established by the EPA. Although arsenic identified was below the MCL, the system should be aware that in October 2001, the EPA lowered the arsenic MCL from 0.05 mg/L to 0.01 mg/L and the system has until 2006 to meet this requirement. No volatile organic chemicals (VOCs) or synthetic organic chemicals (SOCs) have been detected in the drinking water.

Defining the Zones of Contribution--Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel zones (TOT) (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. Washington Group International (WGI) was contracted by DEQ to define the PWS's zones of contribution. WGI used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the East Margin Area of the Eastern Snake River Plain (ESRP) hydrologic province. The computer model used site specific data, assimilated by WGI from a variety of sources including well logs (when available), operator records and hydrogeologic reports. A summary of the hydrogeologic information from the WGI report is provided below.

Hydrogeologic Conceptual Model

The East Margin Area encompasses 821 square miles, representing approximately 8 percent of the total area of the ESRP hydrologic province. The majority of the East Margin Area is within Bingham County, with small areas occurring in Bannock, Bonneville, and Power counties.

The regional ESRP aquifer is the most significant aquifer in the East Margin Area and consists primarily of basalt of the Quaternary-aged Snake River Group. However, additional water-bearing units are used for water supply along the margin of the ESRP. In order of decreasing age, the most significant aquifers in the Michaud Flats area are bedded rhyolite (volcanic rock) of the Tertiary-aged Starlight Formation and Quaternary-aged gravels of a low relief plain formed by running water (pediment), basalt of the Big Hole Formation, and stream deposits of the Sunbeam Formation (see Jacobson, 1982, p. 7, and Corbett, et al., 1980, pp. 6-10). A few shallow domestic wells in the central Michaud Flats area also are completed in Michaud Gravel, which is the shallow water-table aquifer. The American Falls Lake Beds Formation (AFLB) confines the deeper aquifers and averages 80 feet in thickness in the central Michaud Flats area (Jacobson, 1984, p. 6). The AFLB pinches out in the eastern Michaud Flats area near the Portneuf River, effectively combining the shallow and deep stream deposits into a single water table aquifer (Bechtel, 1994, p. 2-2). Other aquifers in the East Margin Area include fractured quartzite that has been developed near Blackfoot, and stream deposits near the cities of Firth and Basalt.

PWS wells in the East Margin Area of the ESRP province produce water from five different aquifers: the Regional Eastern Snake River Plain aquifer, three alluvial (or stream deposited) aquifers (Eastern Michaud Flats, Firth/Basalt, and Gibson Terrace/Pocatello Bench) and a quartzite aquifer (Blackfoot).

Regional Eastern Snake River Plain Aquifer

The ESRP is a northeast trending basin located in southeastern Idaho. The 10,000 square miles of the plain are primarily filled with highly fractured layered Quaternary-aged basalt flows of the Snake River Group, which are between (intercalated) layers of rocks formed by sediment deposition (sedimentary) along the margins (Garabedian, 1992, p. 5). Quaternary-aged basalts are estimated to be 100 to 1,500 feet thick, with the majority of the area in the range of 100 to 500 feet thick (Whitehead, 1992, Plate 3). Individual basalt flows range from 10 to 50 feet thick, averaging 20 to 25 feet thick (Lindholm, 1996, p. 14). Basalt is thickest in the central part of the eastern plain and thins toward the margins. Whitehead (1992, p. 9) estimates the total thickness of the flows to be as great as 5,000 feet. A thin layer (0 to 100 feet) of windblown and stream-produced sediments overlies the basalt. The plain is bounded on the northeast by rocks of the Yellowstone Group (mainly rhyolite) and Idavada Volcanics to the southwest. These rocks may also underlie the plain (Garabedian, 1992, p. 5). Granite of the Idaho batholith borders the plain to the northwest, along with sedimentary rocks and metamorphic rocks (altered by heat and/or pressure) (Cosgrove et al., 1999, p. 10). The Snake River flows along part of the southern boundary and is the only drainage that leaves the plain. A high degree of connectivity with the regional aquifer system is displayed over much of the river as it passes through the plain. However, some reaches are believed to be perched or separated from the main ground water by unsaturated rock, such as the Lewisville-to-Shelley reach. Rivers and streams entering the plain from the south are tributary to the Snake River. With the exception of the Big and Little Wood rivers, rivers entering from the north vanish into the basalts of the Snake River Plain aquifer that have a higher ability to transmit water.

The layered basalts of the Snake River Group host one of the most productive aquifers in the United States. The aquifer is generally considered unconfined, yet may be confined locally because of interbedded clay and dense unfractured basalt (Whitehead, 1992, p. 26). Whitehead (1992, p. 22) and Lindholm (1996, p.1) report that well yields of 2,000 to 3,000 gallons per minute (gpm) are common for wells open to less than 100 feet of the aquifer. Transmissivities obtained from test data in the upper 100 to 200 feet of the aquifer range from less than 0.1 square feet per second (ft^2/sec) to 56 ft^2/sec ($1.0x10^4$ to $4.8x10^6$ square feet per day (ft^2/day); Garabedian, 1992, p. 11, and Lindholm, 1996, p. 18). Lindholm (1996, p. 18) estimates aquifer thickness to range from 100 feet near the plain's margin to thousands of feet near the center. Models of the regional aquifer have used values ranging from 200 to 3,000 feet to represent aquifer thickness (Cosgrove et al., 1999, p.15).

Regional ground water flow is to the southwest paralleling the basin (Cosgrove et al., 1999; deSonneville, 1972, p. 78; Garabedian, 1992, p. 48; and Lindholm, 1996, p. 23). Reported water table gradients range from 3 to 100 feet per mile (ft/mi) and average 12 ft/mi (Lindholm, 1996, p. 22). Gradients steepen at the plain's margin and at discharge locations. The estimated effective ratio of the rock's open space volume to its total volume range from 0.04 to more than 0.25 (Ackerman, 1995, p.1, and Lindholm, 1996, p.16).

The majority of aquifer recharge results from surface water irrigation activities (incidental recharge), which divert water from the Snake River and its tributaries (Ackerman, 1995, p. 4, and Garabedian, 1992, p. 11) and locally from canal leakage. Natural recharge occurs through stream losses, direct precipitation, and tributary basin underflow.

Aquifer discharge occurs primarily as seeps and springs on the northern wall of the Snake River canyon near Thousand Springs and near American Falls and Blackfoot (Garabedian, 1992, p.17). To a lesser degree, discharge also occurs through pumping and underflow.

The East Margin Area is among the most transmissive regions of the regional aquifer, therefore it has a higher ability to transmit water. A transmissivity of 21 ft^2/sec was used to represent the upper 200 feet of the regional aquifer in the East Margin Area in the three-dimensional U.S. Geological Survey (USGS) ground water flow model (Garabedian, 1992, Plate 6). The equivalent hydraulic conductivity or the rate at which water can move through permeable material is 9,072 feet per day (ft/day). This value is consistent with the range of hydraulic conductivity (9,500 to 11,708 ft/day) calculated using data from a constant-rate aquifer test conducted in 1981 (Jacobson, 1982, p. 23). This range was calculated by dividing the estimated transmissivity (228,000 to 281,000 ft^2/day) by the perforated interval of the observation well (24 feet). The geometric mean hydraulic conductivity based on analysis of specific capacity data from PWS wells (135 ft/day) is significantly lower.

A published water table map of the Upper Snake River Basin (IDWR, 1997, p. 9) indicates that the ground water flow direction in the ESRP aquifer in the East Margin Area is similar to that depicted at the regional scale (e.g., Garabedian, 1992, Plate 4).

Recharge from precipitation and surface water irrigation in the East Margin Area ranges from less than 10 to more than 20 inches per year (Garabedian, 1992, Plate 8). The low end of the range applies to the area near Blackfoot, while the high end applies to the area on the west side of American Falls Reservoir near Aberdeen.

Kjelstrom (1995, p. 13) reports an annual river loss of 280,000 acre-feet to the regional basalt aquifer for the 27.5-mile Lewisville-to-Shelley reach of the Snake River and 110,000 acre-feet for the 23.5-mile Shelley-to-Blackfoot reach. Annual river gains of 1,900,000 acre-feet for the 36.6-mile Blackfoot-to-Neeley reach are also estimated (Kjelstrom, 1995, p. 13). A seepage study conducted in the fall of 1980 on the Portneuf River showed a gain of about 560 cubic feet per second (ft^3/sec) (405,691 acre-feet) for the 13-mile Pocatello-to-American Falls Reservoir reach (Jacobson, 1982, p. 16). The average flow in the Blackfoot River near the city of Blackfoot is low at Station #13068500 (5.2 ft^3/sec; USGS, 2001) compared to the flow in the Snake River near the city of Blackfoot at Station #13069500 (2,900 ft^3/sec; USGS, 2001).

The Riverside Elementary School well is completed in the regional basalt aquifer. The delineated source water assessment area for the Riverside Elementary School well trends in a northeast direction and is elongated and conical in shape. The length of the delineation extends approximately 20 miles and extends into the City of Idaho Falls (see Appendix A). The actual data used by WGI to determine the source water delineation area is available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases identified potential contaminant sources within the delineation areas.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply source.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted during November 2001 and November 2002. The first phase involved identifying and documenting potential contaminant sources within the Riverside Elementary School source water assessment area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. The enhanced inventory was completed with the assistance of Alden Hale, the Maintenance Supervisor for the Snake River School District, and corrections were made to the well location and delineation. A map showing the well location, delineated capture zones and potential contaminant sources within the delineation are provided with this report (see Appendix A, Appendix B). Each potential contaminant source has been given a unique site number that references tabular information associated with the PWS's drinking water well.

Section 3. Susceptibility Analyses

The susceptibility of the well to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for the well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The susceptibility analysis worksheet for the Riverside Elementary School well is provided with this assessment (see Appendix C). The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors. These factors are surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the water producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet from the surface protect the ground water from contamination.

Hydrologic sensitivity was rated high for the well. This is based upon moderate to well drained regional soil classes defined by the National Resource Conservation Service (NRCS). The well is also potentially sensitive because no information was available for the well's vadose zone composition, depth to first ground water, and whether there is a 50 feet cumulative thickness of low permeability material above the water bearing zone to help reduce the downward movement of contaminants.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system that can better protect the water. If the casing and annular seal both extend into a low permeability unit then the possibility of cross contamination from other aquifer layers is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capabilities. When information was adequate, a determination was made as to whether the casing and annular seals extend into low permeability units and whether current PWS construction standards are met.

The system construction score was rated moderate for the well. The 1999 sanitary survey states that the well is located ten feet from the building and is next to a paved playground. The well is vented and the surface seal is considered adequate. There was no well log available to determine if the annular seal and well casing extend into low permeable geologic formations, two important aspects of proper well construction. It could not be determined if the highest production for the well was 100 feet below the static water level. The well is located outside a 100-year floodplain, which may decrease the chance of contaminants being drawn into the drinking water source by surface water flooding.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all PWSs to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead and if the well is designed to yield greater than 50 gpm, a minimum 6-hour pump test is required. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. According to the 1999 sanitary survey the well is 8 inches in diameter. It is unknown whether the well is screened. No well log information was available to determine if the well met all IDWR standards, therefore the well's system construction score was conservatively rated.

Potential Contaminant Source and Land Use

The potential contaminant sources and land use within the delineated zones of water contribution are assessed to determine the well's susceptibility. When agriculture is the predominant land use in the area, this may increase the likelihood of agricultural wastewater infiltrating the ground water system. Agricultural land is counted as a source of leachable contaminants and points are assigned to this rating based on the percentage of agricultural land. The predominant land use within the delineated capture zones of the Riverside Elementary School well is predominantly irrigated agricultural land.

In terms of potential contaminant sources and land use susceptibility the ratings are as follows. The well rated high for IOCs, VOCs, and SOCs, and moderate for microbial contaminants.

The potential contaminant sources within the delineation capture zones include major transportation corridors (U.S. Route 26, State Route 39), the Peoples Canal, and network of irrigation canals. An accidental contaminant spill into these sources could add IOC, VOC, SOC and microbial contaminants to the aquifer. Other potential contaminant sources found were dairies, underground storage tank (UST) sites, mines, landfills, deep injection wells, recharge points, and a Wastewater Land Application (WLAP) site. There were sites regulated under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), Superfund Amendments and Reauthorization Act (SARA), and a Group 1 site that shows elevated levels of nitrate that are not within a priority area. Additionally, there were businesses identified that may contribute to the overall vulnerability of the drinking water based upon the type of business or facility. Most of these potential contaminant sources fall within the 6-10 year TOT zone because the City of Idaho Falls is within the well's delineation. A map showing the potential contaminant source locations is provided (see Appendix A) with a complete list of potential contaminant sources included (see Appendix B).

Final Susceptibility Rating

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a confirmed microbial detection at the wellhead will automatically give a high susceptibility rating to the well, despite the land use of the area, because a pathway for contamination already exists. A detection of bacteria at the wellhead in October 1995 resulted in an automatically high susceptibility score. Additionally, potential contaminant sources within 50 feet of the well will automatically lead to a high susceptibility rating. Having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) contribute greatly to the overall ranking.

Susceptibility Summary

In terms of total susceptibility, the Riverside Elementary School's well scored high for IOCs, VOCs, SOCs, and rated automatically high for microbial contaminants (see Table 1). This auto-high rating is due to the bacteria presence at the well source in October 1995. The hydrologic sensitivity score rated high, whereas the system construction score rated moderate. The potential contaminant inventory and land uses scores rated high for IOC, VOC, and SOC, and moderate for microbials.

Table 1. Summary of Riverside Elementary School Susceptibility Evaluation

Drinking Water Source	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Potential Contaminant Inventory and Land Use[2]				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well	H	H	H	H	M	M	H	H	H	H*

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility
[2]IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
H* = Auto high rating for bacteria present in well

Although there have been bacteria present during the water systems history, there have been no detections since October 2001. The IOCs arsenic, barium, fluoride, lead, and nitrate represent the main water chemistry recorded in the PWS, although the reported concentrations of these chemicals were below the MCL for each chemical. Water chemistry tests have not detected VOCs or SOCs in the drinking water.

The county level nitrogen and herbicide chemical use is considered high in this area due to a significant amount of agricultural land. Although there may only be a small portion of agriculture land in the direct vicinity of the well, it is useful as a tool in determining the overall chemical usage, such as pesticides, and how they may impact ground water through infiltration and surface water runoff.

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the Riverside Elementary School, drinking water protection activities should continue efforts aimed at keeping the distribution system free of microbial contaminants that may affect the drinking water quality. If microbial contaminants become a concern, Riverside Elementary School may want to incorporate addition treatment measures to disinfect the water system. The water system's drinking water protection activities should focus on correcting any deficiencies outlined in the sanitary survey, and the well should meet sanitary standards regarding wellhead protection. Any new sources that could be considered potential contaminant sources in the well's zones of water contribution should be investigated and monitored to prevent future contamination. According to the 1999 sanitary survey, the well is located ten feet from a building and is next to a paved playground. Since the building and playground are inside the well's 50-foot sanitary setback, no potential contaminants (i.e., pesticides, paint, fuel, cleaning supplies, etc.) should be stored or applied within this area. Land uses within most of the source water assessment area are outside the direct jurisdiction of the Riverside Elementary School. Therefore partnerships with state and local agencies, and industrial and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating employees and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics may include household hazardous waste disposal methods, proper lawn and garden care, and the importance of water conservation. There are multiple resources available to help water systems implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Bingham County Soil Conservation District. As major transportation corridors intersect the delineation (i.e., US Route 26, State Route 39), the Idaho Department of Transportation should be involved in protection efforts.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning, permitting) or non-regulatory in nature (e.g., good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

DEQ Pocatello Regional Office (208) 236-6160

DEQ State Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper at (208) 343-7001 or email mlharper@idahoruralwater.com), Idaho Rural Water Association, for assistance with drinking water protection (formerly wellhead protection) strategies.

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POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as a Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Appendix A

Figure 2. Riverside Elementary School Delineation Map with Potential Contaminant Source Locations

Appendix B

Riverside Elementary School
Potential Contaminant Source Inventory Table

Table 2. Potential Contaminants

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
	State Route 39	0-3	GIS Map	IOC, VOC, SOC, Microbials
	US Route 26	0-3	GIS Map	IOC, VOC, SOC, Microbials
	Peoples Canal	0-3	GIS Map	IOC, VOC, SOC, Microbials
1	UST Site-Gas Station; Closed	0-3	Database Search	VOC, SOC
2	UST Site-Farm; Closed	0-3	Database Search	VOC, SOC
3	UST Site-Gas Station; Open	0-3	Database Search	VOC, SOC
4	UST Site-Farm; Closed	0-3	Database Search	VOC, SOC
5	Dairy	0-3	Database Search	IOC, Microbials
6	Dairy	0-3	Database Search	IOC, Microbials
7	Farm Supplies (Wholesale)	0-3	Database Search	IOC, VOC, SOC
8	Grain Elevators	0-3	Database Search	IOC, SOC, Microbials
9	Well Drilling	0-3	Database Search	IOC, VOC, SOC
10	Trucking-Liquid & Dry Bulk	0-3	Database Search	VOC, SOC
11	Paint-Retail	0-3	Database Search	VOC
12	Excavating Contractors	0-3	Database Search	IOC, VOC, SOC
13	Agricultural Chemicals (Wholesale)	0-3	Database Search	IOC, SOC
14	Septic Tanks-Cleaning & Repair	0-3	Database Search	IOC, VOC, Microbials
15	CERCLA Site	0-3	Database Search	IOC, VOC, SOC
16	Mine/Quarry	0-3	Database Search	IOC, VOC, SOC
17	Mine/Quarry	0-3	Database Search	IOC, VOC, SOC
18	SARA Site	0-3	Database Search	IOC, VOC, SOC
19	Group 1 Site	0-3	Database Search	IOC
20	Wastewater Land Application Site	0-3	Database Search	IOC, Microbials
21	Landfill	0-3	Database Search	IOC, VOC, SOC, Microbials
22	Landfill	0-3	Database Search	IOC, VOC, SOC, Microbials
23	UST Site-Not Listed; Closed	3-6	Database Search	VOC, SOC
24	UST Site-Farm; Closed	3-6	Database Search	VOC, SOC
25	CERCLA Site	3-6	Database Search	IOC, VOC, SOC
26	Deep Injection Well	3-6	Database Search	IOC, VOC, SOC
27	Recharge Point	3-6	Database Search	IOC, VOC, SOC
28	Recharge Point	3-6	Database Search	IOC, VOC, SOC
29	Recharge Point	3-6	Database Search	IOC, VOC, SOC
30	Recharge Point	3-6	Database Search	IOC, VOC, SOC
31	UST Site-Gas Station; Closed	6-10	Database Search	VOC, SOC
32	UST Site-Local Government; Closed	6-10	Database Search	VOC, SOC
33	UST Site-Gas Station; Open	6-10	Database Search	VOC, SOC
34	Dairy	6-10	Database Search	IOC
35	Dairy	6-10	Database Search	IOC
36	Veterinarians	6-10	Database Search	IOC, VOC
37	Landscape Contractors	6-10	Database Search	IOC, VOC, SOC

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
38	Gazebos	6-10	Database Search	IOC, VOC
39	Painters	6-10	Database Search	VOC
40	Painters	6-10	Database Search	VOC
41	Boat Dealers	6-10	Database Search	VOC, SOC
42	Snowmobiles	6-10	Database Search	VOC, SOC
43	Trucking-Heavy Hauling	6-10	Database Search	VOC, SOC
44	Truck-Repairing & Service	6-10	Database Search	IOC, VOC, SOC
45	Wrecker Service	6-10	Database Search	IOC, VOC, SOC
46	Veterinarians	6-10	Database Search	IOC, VOC
47	Trailers-Horse (Wholesale)	6-10	Database Search	VOC, SOC
48	Laboratories-Testing	6-10	Database Search	IOC, VOC, SOC
49	Dairies	6-10	Database Search	IOC
50	Plumbing Drain & Sewer Cleaning	6-10	Database Search	IOC, VOC
51	Veterinarians	6-10	Database Search	IOC, VOC
52	Automobile Dealers-Used Cars	6-10	Database Search	VOC, SOC
53	Well Drilling	6-10	Database Search	IOC, VOC, SOC
54	Trucking-Heavy Hauling	6-10	Database Search	VOC, SOC
55	Truck Stops	6-10	Database Search	VOC, SOC
56	Limousine Service	6-10	Database Search	VOC, SOC
57	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
58	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
59	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
60	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
61	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
62	Mine/Quarry	6-10	Database Search	IOC, VOC, SOC
63	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
64	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
65	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
66	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
67	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
68	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
69	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
70	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
71	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
72	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
73	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
74	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
75	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
76	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
77	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
78	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
79	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
80	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
81	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
82	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
83	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
84	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
85	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
86	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
87	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
88	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
89	Deep Injection Well	6-10	Database Search	IOC, VOC, SOC
90	SARA Site	6-10	Database Search	VOC, SOC
91	SARA Site	6-10	Database Search	IOC, VOC, SOC
92	SARA Site	6-10	Database Search	IOC, VOC, SOC
93	Recharge Point	6-10	Database Search	IOC, VOC, SOC
94	Recharge Point	6-10	Database Search	IOC, VOC, SOC
95	Recharge Point	6-10	Database Search	IOC, VOC, SOC
96	Recharge Point	6-10	Database Search	IOC, VOC, SOC
97	Recharge Point	6-10	Database Search	IOC, VOC, SOC
98	Recharge Point	6-10	Database Search	IOC, VOC, SOC
99	Recharge Point	6-10	Database Search	IOC, VOC, SOC
100	Recharge Point	6-10	Database Search	IOC, VOC, SOC
101	Recharge Point	6-10	Database Search	IOC, VOC, SOC
102	Recharge Point	6-10	Database Search	IOC, VOC, SOC
103	Recharge Point	6-10	Database Search	IOC, VOC, SOC
104	Recharge Point	6-10	Database Search	IOC, VOC, SOC
105	Recharge Point	6-10	Database Search	IOC, VOC, SOC
106	Recharge Point	6-10	Database Search	IOC, VOC, SOC
107	Recharge Point	6-10	Database Search	IOC, VOC, SOC
108	Recharge Point	6-10	Database Search	IOC, VOC, SOC
109	Recharge Point	6-10	Database Search	IOC, VOC, SOC
110	Recharge Point	6-10	Database Search	IOC, VOC, SOC
111	Recharge Point	6-10	Database Search	IOC, VOC, SOC
112	Recharge Point	6-10	Database Search	IOC, VOC, SOC
113	Recharge Point	6-10	Database Search	IOC, VOC, SOC

[1] UST = underground storage tank, SARA = Superfund Amendments and Reauthorization Act, CERCLA = Comprehensive Environmental Response Compensation and Liability Act
[2]TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Appendix C

Riverside Elementary School Susceptibility Analysis Worksheet

The final scores for the well susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report   Public Water System Name : RIVERSIDE ELEMENTARY SCHOOL   Well# : WELL
Public Water System Number 6060060   12/18/02 4:26:47 PM

1. System Construction		SCORE			
Drill Date	Unknown				
Driller Log Available	NO				
Sanitary Survey (if yes, indicate date of last survey)	YES	1999			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		6			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	18	19	19	10
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	14	11	10	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	2	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		16	16	18	12
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	25% to 50% Irrigated Agricultural Land	1	1	1	
Potential Contaminant Source / Land Use Score - Zone II		4	4	4	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0
Cumulative Potential Contaminant / Land Use Score		27	25	29	14
4. Final Susceptibility Source Score		16	15	16	15
5. Final Well Ranking		High	High	High	High*